I -	4 SPAN CONTINUOUS CONCRETE BOX GIRDER	SPECIAL	DESIGN
_	CONCRETE ABUTMENTS		
3 -	CONCRETE INTERMEDIATE PIERS		
	BAR BENDING DETAILSGA. S	J	

# B. DESIGN SPECIFICATIONS:

- I. AMERICAN ASSOCIATION OF STATE HIGHWAY AND TRANSPORTATION OFFICIALS "AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS," FOURTH EDITION, 2007, WITH INTERIMS THROUGH 2009.
- 2. AMERICAN ASSOCIATION OF STATE HIGHWAY AND TRANSPORTATION OFFICIALS "GUIDE SPECIFICATIONS FOR DESIGN AND CONSTRUCTION OF SEGMENTAL CONCRETE BRIDGES," SECOND EDITION, 1999, WITH 2003 REVISIONS, EXCEPT SECTION 28 OF DIVISION I.
- 3. AMERICAN ASSOCIATION OF STATE HIGHWAY AND TRANSPORTATION OFFICIALS "GUIDE DESIGN SPECIFICATIONS FOR BRIDGE TEMPORARY WORKS, FIRST EDITION, 1995, WITH 2008 INTERIM.
- 4. AMERICAN ASSOCIATION OF STATE HIGHWAY AND TRANSPORTATION OFFICIALS "GUIDE SPECIFICATIONS FOR LRFD SEISMIC BRIDGE DESIGN CRITERIA," FIRST EDITION, 2007 WITH 2010 INTERIM.
- 5. CEB-FIP "MODEL CODE," 1978, THIRD EDITION, (FOR CONCRETE TIME-DEPENDENT PROPERTIES ONLY).

# C. CONSTRUCTION SPECIFICATIONS:

I. GEORGIA STANDARD SPECIFICATIONS, 2001 EDITION, AND 2008 SUPPLEMENTAL SPECIFICATIONS AS MODIFIED BY CONTRACT DOCUMENTS.

### D. DESIGN LOADING:

THE STRUCTURE IS DESIGNED TO ACCOMODATE UP TO FOUR LANES OF TRAFFIC SHOULD THE SIDEWALKS BE REMOVED IN THE FUTURE. CREEP AND SHRINKAGE CALCULATIONS TO AGE 10,000 DAYS ARE PERFORMED ASSUMING THE SIDEWALKS REMAIN IN PLACE. SERVICE AND STRENGTH CALCULATIONS ARE PERFORMED ASSUMING THE SIDEWALKS HAVE BEEN REMOVED AND FOUR LANES OF TRAFFIC ARE PRESENT ON THE STRUCTURE.

## I. PERMANENT LOADS:

- A. UNIT WEIGHT OF POST-TENSIONED AND REINFORCED CONCRETE: WET CONCRETE: 155 PCF CURED CONCRETE: 150 PCF
- B. SPECIAL DESIGN PARAPET: 505 PLF PER SIDE OF BRIDGE
- C. REMOVABLE SIDEWALK: 800 PLF PER SIDE OF BRIDGE
- D. UTILITY ALLOWANCE: O PLF
- E. WEARING SURFACE TYPE: INTEGRAL CONCRETE: 2" AS-CAST, I" NOMINAL AFTER INITIAL GRINDING TO PROFILE
- F. UNIT WEIGHT OF ABUTMENT BACKFILL (MSE WALL SPECIAL BACKFILL): 125 PCF
- G. HORIZONTAL AT REST EARTH PRESSURE (APPLIED TO ABUTMENT STEM): 45 PSF/FT
- H. HORIZONTAL ACTIVE EARTH PRESSURE (APPLIED TO ABUT. BACKWALL): 28 PSF/FT
- I. HORIZONTAL PASSIVE EARTH PRESSURE (APPLIED TO ABUTMENT TOE): 345 PSF/FT (TOP 2 FT. OF SOIL IS NEGLECTED IN RESISTANCE CALCULATION)
- 2. LIVE LOADS: HL-93 WITH IMPACT (DESIGN TRUCK OR TANDEM AND DESIGN LANE LOAD).
- 3. WIND LOADS: AS PER "AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS" WITH "SUBURBAN" SURFACE CONDITION USED FOR DESIGN.
- 4. THERMAL FORCES:
  - A. ASSUMED TEMPERATURE DURING CONSTRUCTION: 75°F
  - B. SEASONAL TEMPERATURE EXTREMES: MAXIMUM TEMPERATURE: 105° F MINIMUM TEMPERATURE: 25° F

D. DESIGN LOADING (CONT.):

C. DESIGN TEMPERATURE VARIATION: TEMPERATURE RISE: 30° F TEMPERATURE FALL: 50° F

- D. THERMAL COEFFICIENT: 0.000006 °F
- E. TEMPERATURE GRADIENT: AS PER "AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS", ZONE 3.
- 5. CREEP AND SHRINKAGE:

STRAINS ARE CALCULATED IN ACCORDANCE WITH "CEB-FIP MODEL CODE", 1978, WITH A RELATIVE HUMIDITY OF 75% AND AVERAGE TEMPERATURE OF 75°F. FINAL CREEP AND SHRINKAGE AGE IS 10,000 DAYS.

- 6. THE DESIGN IS BASED ON AN ASSUMPTION OF CONSTRUCTION LOADS IMPACTING SERVICE AND STRENGTH DESIGN.
  - A. ASSUMED CONSTRUCTION EQUIPMENT: FORM TRAVELLER WITH CORE FORMS: 225 K FORM TRAVELLER WITHOUT CORE FORMS: 160 K
  - B. TRANSIENT CONSTRUCTION LOADS: AS PER "GUIDE SPECIFICATIONS FOR DESIGN AND CONSTRUCTION OF SEGMENTAL CONCRETE BRIDGES".
- 7. DESIGN LOAD COMBINATIONS: AS PER "AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS"
- 8. CONSTRUCTION LOAD COMBINATIONS: AS PER "AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS", AND "AASHTO GUIDE SPECIFICATIONS FOR DESIGN AND CONSTRUCTION OF SEGMENTAL BRIDGES".

#### E. MATERIALS:

- I. CONCRETE (28-DAY CYLINDER STRENGTH AS NOTED):
  - A. SUPERSTRUCTURE (INCLUDING SECONDARY EDGE POURS): CLASS AAA, fc = 6000 PSI
  - B. SUPERSTRUCTURE (SIDEWALKS): CLASS AA, f6 = 3500 PSI
  - C. SUBSTRUCTURE (ABUTMENT, PIERS, FOOTINGS): CLASS AA, f = 3500 PSI
  - D. DRILLED SHAFTS: fc = 3500 PSI
- 2. REINFORCING STEEL:
  - A. ALL DEFORMED REINFORCING BARS ARE AASHTO M 31 (ASTM A615), GRADE 60
  - B. CONCRETE COVER (UNLESS SHOWN OTHERWISE IN THE PLANS):

## SUPERSTRUCTURE:

- I. TOP OF DECK (EXCLUDING INTEGRAL WEARING SURFACE): 21/2 IN.
- 2. ALL OTHER SURFACES: 1岁 IN.

# SUBSTRUCTURE:

- I. SURFACES CAST AGAINST FORMS: 2 IN.
- 2. SURFACES CAST AGAINST EARTH: 3 IN.
- 3. POST-TENSIONING STEEL:

STRAND: AASHTO M203(ASTM A-416), SEVEN-WIRE, GRADE 270, LOW RELAXATION

STRAND SIZE:

0.60" DIAMETER (LONGITUDINAL POST TENSIONING) 0.50" DIAMETER (TRANSVERSE POST TENSIONING) 28.500 KSI

APPARENT MODULUS:

216 KSI (80% OF ULTIMATE) MAXIMUM JACKING STRESS: +89 KSI (70% OF ULTIMATE)

MAXIMUM ANCHORING STRESS: ASSUMED ANCHOR SET:

¾ IN. ASSUMED FRICTION COEFFICIENT: 0.23

ASSUMED WOBBLE COEFFICIENT: ASSUMED "Z":

0.0002 (INTERNAL TENDONS) I" (LONGITUDINAL POST-TENSIONING)

0.32" (TRANSVERSE POST-TENSIONING)

# F. ALLOWABLE STRESSES/LOADS:

GA. CSHPP-0007-00(550) 54 178 CSSTP-M002-00(960)

I. DESIGN METHOD: THE SUPERSTRUCTURE IS DESIGNED FOR APPLICABLE SERVICE AND STRENGTH LIMIT STATES AS DEFINED BY THE LOAD GROUPS IN THE AASHTO LRFD SPECIFICATIONS. THE SUBSTRUCTURE IS DESIGNED FOR THE APPLICABLE STRENGTH LIMIT STATES AS DEFINED BY THE LOAD GROUPS IN THE AASHTO LRFD SPECIFICATIONS AND CHECKED FOR THE CRACK CONTROL PROVISIONS IN SECTION 5.7.3.4 OF THE AASHTO LRFD SPECIFICATIONS.

2. SUPERSTRUCTURE CONCRETE STRESSES (SERVICE CRITERIA):

 $3\sqrt{f_c}$  PSI (0.0948  $\sqrt{f_c}$  KSI) (CAST-IN-PLACE) TENSION:

COMPRESSION: 0.45 f PSI (DUE TO POST-TENSIONING AND PERMANENT LOADS)

Φw 0.60 fc PSI (ALL OTHER LOAD CASES) Фw PER AASHTO LRFD SECTION 5.7.4.7

3. SUPERSTRUCTURE CONCRETE STRESSES (TEMPORARY STRESS CRITERIA):

 $3\sqrt{f_c'}$  PSI (0.0948  $\sqrt{f_c'}$  KSI) (CAST-IN-PLACE)

COMPRESSION: 0.60 fc PSI

4. SUPERSTRUCTURE CONCRETE STRESSES (CONSTRUCTION CRITERIA):

TENSION: PER AASHTO LRFD TABLE 5.14.2.3.3-1 (CAST-IN-PLACE)

COMPRESSION: 0.50 fc PSI, NOT TO EXCEED  $\Phi_{w}$  0.6 fc PSI

5. SEGMENT CASTING AND ERECTION:

- A. MINIMUM CONCRETE STRENGTH BEFORE STRESSING LONGITUDINAL AND TRANSVERSE POST-TENSIONING, RELEASING FORMWORK, AND ADVANCING TRAVELERS: 3000 PSI
- B. FOR PURPOSES OF DESIGN, AVERAGE AGE OF SEGMENTS FOR ADVANCEMENT OF FORM TRAVELERS ASSUMED TO BE: 3 DAYS
- C. FOR PURPOSES OF DESIGN, AVERAGE CASTING CYCLE FOR A PAIR OF SEGMENTS ASSUMED TO BE: I WEEK

## G. FOUNDATIONS:

I. FOUNDATION TYPE

DRILLED SHAFTS IN LIME ROCK

ABUTMENTS | & 5 FOUNDATIONS: PIERS 2 & 3 FOUNDATIONS: PIER 4 FOUNDATIONS:

66" DIAMETER, SOCKETED 20' INTO SOUND ROCK 78" DIAMETER, SOCKETED 20' INTO SOUND ROCK 66" DIAMETER, SOCKETED 20' INTO SOUND ROCK

BRIDGE NO. I

